

WHAT IS CLAIMED IS:

1. An ink jet head for recording an image on a recording medium by ejecting ink containing charged fine particles by means of an electrostatic force, comprising:

an ink guide whose tip end portion is directed toward a side of said recording medium;

an ink flow path that supplies the ink to said ink guide; and

an ejection electrode that comprises a surrounding electrode arranged so as to surround an outer periphery of said ink guide with a predetermined spacing, and ejects the ink guided from said ink flow path to the tip end portion of said ink guide by means of the electrostatic force,

wherein a ratio between an effective inside diameter of said surrounding electrode and a distance from said surrounding electrode to a tip end of said ink guide protruding on the side of said recording medium is set in a range of 1:0.5 to 1:2.

2. The ink jet head according to claim 1, wherein said surrounding electrode is a substantially circular electrode, and said effective inside diameter is an average inside diameter.

3. An ink jet head for recording an image on a recording medium by ejecting ink containing charged fine particles by means of an electrostatic force, comprising:

an ink guide whose tip end portion is directed toward a side of said recording medium;

an ink flow path that supplies the ink to said ink guide; and

an ejection electrode that comprises side-by-side electrodes arranged on both sides of said ink guide so as to oppose each other with a predetermined spacing, and ejects the ink guided from said ink flow path to the tip end portion of said ink guide by means of the electrostatic force,

wherein a ratio between an effective spacing between said side-by-side electrodes and a distance from said side-by-side electrodes to a tip end of said ink guide protruding on the side of said recording medium is set in a range of 1:0.7 to 1:2.8.

4. The ink jet head according to claim 3, wherein said side-by-side electrodes are substantially parallel electrodes, and said effective spacing is an average electrode spacing.

5. The ink jet head according to claim 1, wherein:
said ink guide is arranged on a head substrate;
said ink flow path is formed between said head
substrate and an insulating substrate arranged so as to be
spaced apart from said head substrate by a predetermined
distance;

through holes are formed in said insulating
substrate; and

said ink guide has said tip end portion protruding on
the side of said recording medium from one of the through
holes formed in said insulating substrate and guides the
ink flowing in said ink flow path from said ink flow path
to said tip end portion.

6. The ink jet head according to claim 5, wherein a
contact angle of a surface of said ink guide in at least a
portion existing in said through hole with respect to the
ink is set larger than a contact angle of an inner wall
surface of said through hole with respect to the ink.

7. The ink jet head according to claim 6, wherein
said surface of said ink guide in at least the portion
existing in said through hole has ink-repellent property.

8. The ink jet head according to claim 6, wherein a difference between said contact angle of said surface of said ink guide in at least the portion existing in said through hole with respect to the ink and said contact angle of said inner wall surface of said through hole with respect to the ink is set at not less than 10 degree.

9. The ink jet head according to claim 6, wherein said contact angle of said surface of said ink guide in at least the portion existing in said through hole with respect to the ink is set at not less than 20 degree.

10. The ink jet head according to claim 6, wherein said ink guide in at least the portion existing in said through hole is configured with a ink-repellent member, and said surface of said ink guide in at least the portion existing in said through hole is processed with a ink repellent material.

11. The ink jet head according to claim 5, wherein said ink contains charged fine particles which are dispersed in a solvent, and said ejection electrode is provided on a side of said insulating substrate in said ink

flow path.

12. The ink jet head according to claim 1, wherein said tip end portion of said ink guide has an affinity for the ink.

13. The ink jet head according to claim 1, further comprising:

a guard electrode which is provided between adjacent ejection electrodes and suppresses electric field interferences occurring between the adjacent ejection electrodes.

14. An ink jet recording apparatus, including an ink jet head for recording an image on a recording medium by ejecting ink containing charged fine particles by means of an electrostatic force, said ink jet head comprising:

two or more ink guides, a tip end portion of each ink guide being directed toward a side of said recording medium;

one or more ink flow paths that supply the ink to said two or more ink guides; and

two or more ejection electrodes, each ejection electrode comprising a surrounding electrode arranged so as

to surround an outer periphery of said ink guide with a distance, and ejecting the ink guided from said ink flow path to the tip end portion of said ink guide by means of the electrostatic force,

wherein a ratio between an effective inside diameter of said surrounding electrode and a distance from said surrounding electrode to a tip end of said ink guide protruding on the side of said recording medium is set in a range of 1:0.5 to 1:2.

15. The ink jet recording apparatus according to claim 14, further comprising:

means for holding said recording medium;

means for relatively moving said ink jet head and said recording medium;

means for applying a predetermined bias voltage between said ejection electrode and said recording medium; and

means for applying a predetermined ejection voltage to said ejection electrode in accordance with said image to be recorded on said recording medium.

16. An ink jet recording apparatus, including an ink jet head for recording an image on a recording medium by

ejecting ink containing charged fine particles by means of an electrostatic force, said ink jet head comprising:

two or more ink guides, a tip end portion of each ink guide being directed toward a side of said recording medium;

one or more ink flow paths that supply the ink to said two or more ink guides; and

two or more ejection electrodes, each ejection electrode comprising side-by-side electrodes arranged on both sides of said ink guide so as to oppose each other with a distance, and ejecting the ink guided from said ink flow path to the tip end portion of said ink guide by means of the electrostatic force,

wherein a ratio between an effective distance between said side-by-side electrodes and a distance from said side-by-side electrodes to a tip end of said ink guide protruding on the side of said recording medium is set in a range of 1:0.7 to 1:2.8.

17. The ink jet recording apparatus according to claim 16, further comprising:

means for holding said recording medium;

means for relatively moving said ink jet head and said recording medium;

means for applying a predetermined bias voltage
between said ejection electrode and said recording medium;
and

means for applying a predetermined ejection voltage
to said ejection electrode in accordance with said image to
be recorded on said recording medium.